



sasol

Product Stewardship Summary

Alcohol Ethoxylates

Introduction:

This Product Stewardship Summary document is a summary intended to provide the general public with an overview of product safety information on this chemical substance. It contains basic information and is not intended to provide emergency response information, medical or treatment information, or to provide a discussion of all safety and health information. This document is not intended to replace the Safety Data Sheet (SDS). Before handling or using Alcohol Ethoxylates (AEs), the relevant SDS has to be consulted.

AEs are synthetic chemicals that do not occur naturally. Since the majority of AEs are used in cleaners and detergents, the largest recipient of chemical inputs is the aquatic environment, primarily through wastewater effluent as a result of consumer disposal practices. Other potential sources of exposure exist within the industrial sectors where AEs are manufactured or used (industrial cleaners, pulp and paper, chemical manufacture).

The text continues: "Natural degradation processes and wastewater treatment techniques remove a large proportion of AE from water, however there is still potential for aquatic exposure. Once introduced into the aquatic environment, they have the potential to adsorb to particulate matter and be deposited to sediments."

Chemical Identity and Properties:

Alcohol ethoxylates are a class of nonionic surfactants that contain a hydrophobic alkyl chain attached via an ether linkage to a hydrophilic ethylene oxide (EO) chain and have the general structure $R(OCH_2CH_2)_nOH$. The alkyl chain, R, can vary in length and in the degree of linearity, but is typically between 8 and 18 carbons long (for detergent range surfactants). The EO chain can also vary in length from 1 to 40 EO units. An AE with the structure $C_{9-11}EO_{6.5}$, for example, contains a range of alkyl chain lengths of 9-11 and averages 6.5 EO units per alkyl chain.

Due to the large number of possible AEs, many different CAS numbers and trade names exist for AEs. The hundreds of different possible AEs each have slightly different chemical and physical properties, however, the presence of a strong hydrophilic (ethoxylate chain) and strong hydrophobic (alkyl chain) moiety linked together gives them their characteristic surfactant properties. AEs concentrate at surfaces and interfaces in aqueous solutions and create a surface film which reduces the surface tension of water and alters the wetting properties between water and solids.

At ambient temperature and pressure AEs are clear to cloudy organic liquids with a mild characteristic odor. The density at 20°C is 0.7 – 0.92 g/cm³, which is lower than that of water. These substances freeze in a temperature range of <-20 to 22°C, and have low vapor pressures and water solubilities. They do not react with water or contain any groups that might oxidise or spontaneously ignite.

Uses:

Alcohol Ethoxylates (AEs) have many uses. AEs are used in laundry detergents and other cleaning products. They loosen dirt and allow water to soak into fabrics. AEs can also be used to help cleaning products foam and to keep oils and water mixed together. Products with AEs can be found in households, paper industry, leather industry, paint industry, agriculture, mining and car washes.

Alcohol Ethoxylates can be turned into other chemicals. These chemicals are also used as cleaning products, to create foam and to help keep oils and water mixed together.



Health Effects Summary:

| Effect Assessment | Result |
|----------------------------------|--|
| Acute Toxicity | Harmful if swallowed. Considered of low toxicity by oral, dermal, and inhalation routes of exposure. |
| Irritation / corrosion | Causes serious eye damage. May be a skin irritant. |
| Sensitization | Not considered to be sensitizing. |
| Toxicity after repeated exposure | Considered as of low toxicity by oral route of exposure. |
| Genotoxicity / mutagenicity | Not mutagenic. |
| Carcinogenicity | Not considered as carcinogenic. |
| Toxicity for reproduction | Available data do not indicate reproductive toxicity potential. |

Environmental Information:

Based on available data for the pure substances, AEs may be very toxic to aquatic organisms for short term exposure and harmful in the long term. They do not bioaccumulate, are readily biodegradable and will not persist in the environment. It may adsorb to soil and sediments.

Environmental Effects Summary:

| Effect Assessment | Result |
|--------------------------|--|
| Aquatic Toxicity | Very toxic to aquatic life. Harmful to aquatic life with long lasting effects. |



Environmental Fate Summary:

| Fate and Behavior | Result |
|---------------------------|--|
| Biodegradation | Readily biodegradable. |
| Bioaccumulation potential | Low potential for bioaccumulation. |
| Mobility | May adsorb on soil. The product evaporates slowly. |

Exposure Potential:

Exposure to personnel in manufacturing facilities is considered very low because the process, storage and handling operations are enclosed. Workers who might accidentally come in contact with the non-formulated, undiluted substances should follow the safety measures recommended in the Safety Data Sheet (SDS).

The exposure of consumers to AEs in articles is regarded to be safe. The general public can be exposed to AEs through their use in detergents and cleaning supplies. Assessments of Alcohol Ethoxylate consumer use show that people are only exposed to extremely low amounts of the chemical under normal conditions. Consumers should always consult product labels for hazard and safe handling information.

Risk Management:

AEs can be stored, transferred, processed and disposed of safely when proper procedures and safeguards are employed in industrial use. AE production is carried out in equipment designed to prevent exposure to workers and release to the environment. Tanks, piping, pumps, and other processing equipment are specified for handling of these materials. Secondary containment around storage tanks, process air combustion, scrubbers and other means are used to further protect from release to the environment. Access to the production facility is restricted to employees, and approved contractors and visitors.

Personal protective equipment such as chemical resistant suits, gloves and boots, goggles or face shields must be worn when handling or transferring AEs as dictated by the extent of potential exposure. Steel drums, tank trucks, railcars and other

transport vessels are inspected prior to and after loading to ensure that no product is released. Carriers are approved and their performance reviewed. Sasol utilizes Chemtrec® and the National Chemical Emergency Centre (NCEC) as 24 hour contact numbers to provide emergency response information to transportation workers and first responders in the case of an accident en route.



Safety Data Sheets (SDS) for each product and practical safe handling information are provided to our customers and carriers so that they are able to use and transport our products safely. These documents include chemical and physical properties, recommended storage conditions and personal protective equipment, firefighting and first aid information, accidental release measures, exposure guidelines and other regulatory information. Please refer to these documents for additional details.



Regulatory Information:

AEs are classified as hazardous for workers and in transportation. They are regulated under a variety of local, state, federal and international laws requiring exposure and environmental controls, as well as various means of hazard communication such as labeling and SDS.

Classification and labelling

Under GHS, substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the SDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use. The following classification and labelling information is based on the US Occupational Safety and Health Administration (OSHA) Hazard Communication Standard. Other regional classification and labelling information, such as substances registered for REACH in the European Union (EU), may differ from the US classification and labelling information.

Classification

Acute oral toxicity Category 4
 Serious eye damage/irritation Category 1
 Acute aquatic toxicity Category 1
 Chronic aquatic toxicity Category 3

Labelling

Signal word: Danger

Hazard pictograms:



Hazard statements:

H302 Harmful if swallowed.
 H318 Causes serious eye damage.
 H400 Very toxic to aquatic life.
 H412 Harmful to aquatic life with long lasting effects.

Precautionary statements:

P264 Wash skin thoroughly after handling.
 P270 Do not eat, drink or smoke when using this product.
 P280 Wear eye protection/ face protection.
 P301 + P312 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell.
 P330 Rinse mouth.
 P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P310 Immediately call a POISON CENTER/doctor.
 P391 Collect spillage.
 P273 Avoid release to the environment.
 P501 Dispose of contents/ container to an approved waste disposal plant.

Product Stewardship:

Sasol is firmly committed to the safe manufacture, handling and distribution of our products. We incorporate product stewardship and safety into our operating and business decisions. We actively communicate our product stewardship expectations to new and existing customers and distributors. Our procedures require evaluation of potential customers with regard to the suitability of the proposed use and the safe handling systems in place prior to establishing a supply relationship. We conduct audits of customers, warehouses, and carriers as appropriate. We perform periodic product risk reviews to identify actions we can take to further minimize risk with regard to distribution and use of AEs. Progress is tracked in implementing the identified actions. Results of these reviews are communicated throughout the organization so that employees are aware of the specific ways in which we meet our commitment to product stewardship and how they can support the effort.

We provide SDS and safe handling information to customers. We welcome questions and open communication with customers regarding practical handling and safety practices for our products. Our SHES (safety, health, environmental & security), operations, maintenance and technical service personnel are ready resources for customers and others involved in using or transporting our products.

Conclusion:

AEs are important chemical ingredients for products that consumers use every day at home, in travel, and in the workplace. They have a long history of helping make our lives more comfortable, safe, productive and healthy. Although AEs themselves are hazardous materials, they are regulated for public safety and measures are in place for their safe manufacture, storage, distribution and use.

For Further Information:

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| E-mail address | usasales@sasol.com |
| ICCA portal | http://www.icca-chem.org/en/Home/Global-Product-Strategy/ |

Glossary:

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|------------------|--|
| Acute toxicity | Harmful effect resulting from a single or short term exposure to a substance. |
| Biodegradation | Decomposition or breakdown of a substance under natural conditions (action of microorganisms, etc.). |
| Bioaccumulation | Progressive accumulation in living organisms of a chemical substance present in the environment. |
| Carcinogenicity | Substance effects causing cancer. |
| Chronic toxicity | Harmful effect after repeated exposures or long term exposure to a substance. |
| Clastogenicity | Substance effect that causes breaks in chromosomes. |
| Embryotoxicity | Harmful effect on fetal health. |
| Flash point | The lowest temperature at which vapor of the substance may form an ignitable mixture with air. |
| Genotoxicity | Substance effect that causes damage to genes, including mutagenicity/clastogenicity. |
| GHS | Global Harmonized System on Classification and Labelling of chemicals. |

| | |
|----------------|---|
| Hazard | Inherent substance property bearing a threat to health or environment. |
| Mutagenicity | Substance effect that cause mutation on genes. |
| Persistance | Refers to the length of time a compound stays in the environment, once introduced. |
| REACH | REACH stands for Registration, Evaluation, Authorisation and Restriction of Chemicals. REACH is a regulation of the European Union, adopted to improve the protection of human health and the environment from the risks that can be posed by chemicals, while enhancing the competitiveness of the EU chemicals industry. |
| Reprotoxicity | Including teratogenicity, embryotoxicity and harmful effects on fertility. |
| Sensitizing | Allergenic. |
| Sediment | Topsoil, sand and minerals washed from land into water forming in the end a layer at the bottom of rivers and sea. |
| Teratogenic | Substance effect on fetal morphology. |
| Vapor pressure | A measure of a substance's property to evaporate. |
| Volatile | Any substance that evaporates readily. |

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References:

- ALFONIC® 1412-3 Ethoxylate SDS
- ALFONIC® 1412-3 Ethoxylate Technical Data Sheet
- Alcohol Ethoxylate, PRODUCT STEWARDSHIP SUMMARY, 07/16/2009
- Sasol GPS Safety Summary Alcohols, C12-14, ethoxylated, < 2.5 EO
- Canadian Environmental Protection Act, 1999
- Federal Environmental Quality Guidelines
- Alcohol Ethoxylates, Environment Canada
- February 2013

Disclaimer:

This product stewardship summary is intended to give general information about the chemical or categories of chemicals addressed. It is not intended to provide an in-depth discussion of health and safety information. Additional information is available through the chemical's applicable Safety Data Sheet which should be consulted before use of the chemical. The product stewardship summary does not supplant or replace required regulatory and/or legal communication documents.

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